# PIPELINE & GAS JOURNAL

*International Pipeline & Gas Utility Design, Construction & Operation*

*Published Continuously Since 1859*


# in this issue


| | |
|---|---|
| Newsreel<br>Highlights of month's news | 2 |
| Government Guidelines<br>State & Federal regulatory memo | 4 |
| Upstream<br>Future events in today's news | 6 |
| Reflections<br>A glimpse of 50 & 100 years ago | 8 |
| MCF<br>Industry news/developments | 10 |
| Projects<br>New systems/expansion/developments | 14 |
| People On The Move | 45 |
| Meetings | 47 |
| Bookshelf | 48 |
| Oil & Gas Professional Opportunities | EM3 |
| Advertiser's Index | EM10 |

Energy Management Report

| | |
|---|---|
| Comment | EM 1 |
| Energy World Report | EM 2 |
| Financial Notebook | EM 4 |
| New Products | EM 5 |

**COVER**

A little snow won't stop this crew from Wisconsin Gas Company from doing their bit in the expansion of the U.S. gas utility piping system.

*—photo courtesy Wisconsin Gas Co.*


DECEMBER 1983 • VOLUME 210 • NUMBER 14



Increased Emphasis On Maintenance Hikes 1984 Outlay To $3.76 Billion .....18

U.S. gas utilities will spend almost $4 billion on expanding, upgrading, maintaining, and repairing the nation's gas distribution network.

Plastic Pipe Makes Big Move In 1983 .....20

Plastic pipe accounted for 88.6% of all piping installed by gas utilities in 1983, a total of 19,920 miles of plastic pipe.

Q. What Can Go Wrong In A Gas Distribution System?
A. Plenty! .....22

Some of the most common problems facing gas utilties are discussed, along with suggested remedies.

Large Diameter Insert Renewal Made On Medium Pressure Main .....32

National Fuel Gas has completed a gas main insertion project in Buffalo, N.Y., involving the insertion of 10-in. PE pipe into an existing steel system.

What's New In Gas Distribution Piping and Equipment .....34

The latest ideas and new innovations in gas distribution piping are included.

Radar-Based Plastic Pipe Locator Redesigned, Improved .....42

Unit first field tested in 1977 has some dramatic new improvements.

Construction Equipment Specification Sheets—Arc Welders Part 1 .....43

Specifications of engine driven arc welding machines.

*Distribution Piping Forecast*

# Maintenance Hikes 1984 Outlay To $3.76 Billion

by Jim Watts, *Assistant Editor*

The U.S. gas distribution network is benefitting from an increased emphasis by utilities on maintenance and repair of their existing system. Results of the 18th annual PIPELINE & GAS JOURNAL distribution piping survey show expenditures for new and replacement mains and services only slightly ahead of expenditures for system maintenance and repair.

An estimated $3,764,883,700 will be spent on system maintenance, repair, replacement, and extension in 1984, up from the estimated $3,689,030,500 spent in 1983.

Figures show that the estimate in the 1982 survey on 1983 expenditures for new and replacement mains and services, $1,735,884,100, was very close to the final figure for 1983 in the new survey, $1,757,231,200.

However, the earlier estimate of $925,970,400 for maintenance and repair in 1983 was far too low. The actual figure was $1,631,799,300, up 76% from the 1983 estimate and more than 92% above the $848,819,350 spent on system maintenance and repair in 1982.

Utilities say they expect to spend $1,973,958,700 for new and replacement mains and services and $1,790,925,000 for system maintenance and repairs in 1984.

If all the money expected to be appropriated for work in 1984 is indeed spent, the figure will be the largest to date in U.S. history.

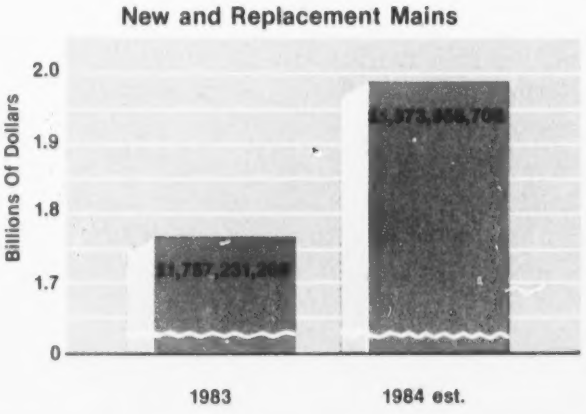
Another 22,470 miles were added to the nation's gas distribution network in 1983—10,950 miles of mains and 11,520 miles of services. With the latest additions, the U.S. distribution network totals 1,403,403 miles as of Dec. 31, 1983, including 853,941 miles of mains and 549,462 miles of services.

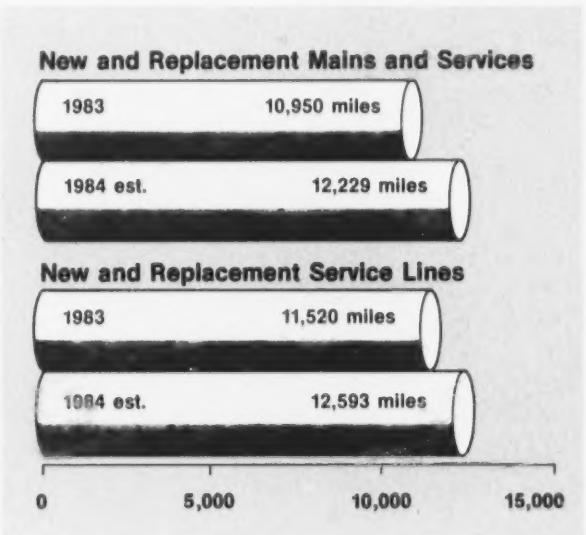
The growth will continue in 1984, with an estimated 12,229 miles of mains and 12,593 miles of services expected to be added.

The increasing importance of maintenance and repairs as a function of gas utilities can be noticed in maintenance's increasing share of the budget. Maintenance and repairs accounted for 36.6% of the total construction budget in 1981 and 36.1% in 1982—rising to 44.2% in 1983 and an estimated 47.5% in 1984.

An estimated 574,000 new gas customers were added by utilities in 1983, compared to 427,000 new customers in 1982. Utilities say the total includes 478,000 new residential customers attributed to new construction, 82,000 customers switching to gas heating from other fuels, and 14,000 new industrial and commercial customers.

The survey polled more than 350 gas utilities, including the 300 largest as reported in the August 1983 PIPELINE & GAS JOURNAL, serving more than 97% of U.S. gas customers.




## Contractor Usage Varies

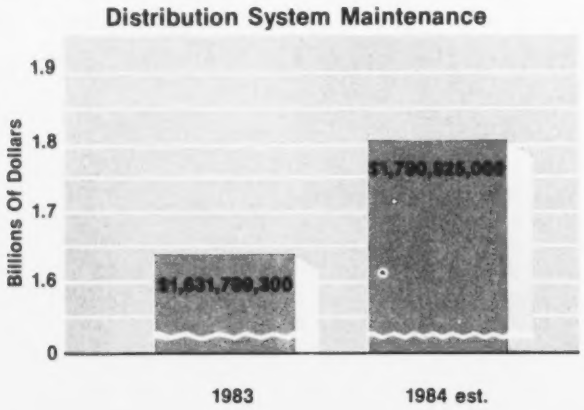
Asked if they were relying upon outside contractors more in 1983 than in the past, most respondents said they were being forced to cut back on outside help due to a tightening of budgets and a slowdown in work. Generally, gas company executives said they relied on company crews to maintain a certain level of construction, going to distribution contractors only when the work

grew too heavy for company personnel.

However, many of the larger utilities say they increased the percentage of work going to contractors due to large renewal and replacement programs. Utilities that have an extensive program of replacing their cast iron or bare steel systems with coated steel or plastic pipe say they used outside contractors for much of the work. That practice left company crews available for leak repairs and isolated maintenance duties.

There are definitely two schools of thought in the use of outside contractors. Many utilities say they used company crews to do construction work because it is cheaper; others tell PIPELINE & GAS JOURNAL that they found it cheaper to cut back on the company work force due to the seasonal aspect of the work in much of the country. The flexibility of hiring a contractor when work must be performed and not having to maintain a large company payroll is attractive to these companies.

Some say they feel they have better control over the quality of the work done by company crews than by an independent contractor. Others report that they have used outside contractors for more than 90% of their work for years and are completely satisfied with what they are getting.




Below is a sample of the comments on the question, "Have you increased or decreased the percentage of work awarded to contractors? Why?"

"Decreased, because with the slowdown in construction we have the time and manpower to do our own."

"The percentage of work going to contractors has been down. We use our own crews for routine construction and use contractors to help us out when things get busy. Since we haven't been that busy, we haven't had as many occasions to go outside."

"Decreased because of more construction done by company employees."

"Due to mild winter, the percentage of contractors' work has decreased, although now it is starting to pick up again."

"We are doing as much as possible with our own personnel to cut total expenditures."

"Decreased, contractors cost too much."

"Decreased, company personnel are capable of most construction."

"We are utilizing our own personnel to a greater extent."

"Increased. Due to some manpower cutbacks and normal attrition our construction work force has been cut by 50%. Our employees are mainly concentrating on gas systems repairs rather than new construction."

"Increased. More flexibility with labor requirements result in overall savings."

"Increased due to increased replacement program. Frees our personnel for isolated leak repair and required monitoring."

"Due to the size of our replacement program we decided to contract most of the work."

"We have increased the amount of construction of mains and services being done by contractors due to seasonal nature of this type of work."

## One-Call Systems: Useful If Used

One-call systems, designed to warn third-party excavators of the presence of gas lines near a job site, are becoming increasingly popular. Damage by a third party cannot only be expensive, it can be very dangerous. Recognizing this, utilities are organizing and participating in one-call systems. In some cases, formation of warning networks is mandated by state or local authorities. Most members say such systems are very helpful; some say the expense has outweighed the benefits.

The problems involved in a one-call, or call-before-you-dig, program are many. Some utilities have only a vague idea where some of their lines are, and remapping is very expensive. Coordinating all the utilities that have underground lines—gas, electric, water, sewer, and cable TV—can be complicated. The biggest problem of all is getting excavators to participate.

In areas where one-call systems exist, gas utilities sometimes have a hard time getting excavators to tell them where they are going to dig. The best compliance is where a state or local law requires a permit before excavation can be performed.

Where a one-call system is in place and outside contractors are required to cooperate, safety records are very high. Otherwise, compliance rests upon responsible contractors who recognize the dangers involved before digging without knowing—or caring—what lies below the surface.

P&GJ asked utilities: "Do you have a one-call system designed to prevent accidental dig-ins? If so, has it proved beneficial?" Replies included:

"Yes, it is a good thing."

"We are in a one-call system but have had some problems with compliance."

"No, but I wish we did."

"How beneficial seems to depend upon individuals doing the locating. Experience is a big factor."

"Anyone who digs in our area needs a digging permit."

"We belong to six such systems and are currently joining another. We consider them beneficial, but it's difficult to quantify benefits."

"State [illegible] penalizes contractors who don't give proper notificati[illegible]

"It's bene[illegible]al if people use it."

"The system has been in use for many years and is well organized. During 1982, of 198 accidental dig-ins (89 services, 13 mains), majority w[illegible]all contractors or home owners. The other 30% wc[illegible]e or failure to hand dig."

"We operate an [illegible]use system, and it has proved very beneficial."

P&GJ

*P&GJ Plastice Pipe Survey*

# Plastic Pipe Makes Big Move In 1983

**P&GJ Staff Report**

Plastic pipe made a big move in the gas distribution market in 1983, accounting for an estimated 88.6% of all piping installed in the year. Preliminary estimates for 1984 indicate plastics percentage will drop in the next 12 months, to 78.5% of the total installed.

Based on the current piping survey as well as earlier reports, plastice pipe appears to have reached a plateau in the U.S. It is unlikely that the percentage of plastic pipe will dip below 70%, but it is also unlikely that it will go above 90% in the foreseeable future.

In general, plastic pipe has made its biggest inroads on steel in the larger markets. Plastic pipe is winning more and more converts for a variety of reasons. It is easier to transport and install than steel pipe, it requires no cathodic protection, and it can be installed without the need for welders and other highly trained personnel. Those reasons and more are very attractive to large as well as small gas utilities.

However, many small utilities are resisting the trend towards plastic pipe. The advantages outlined above are not so important to them, and they feel comfortable with steel pipe, which has proved its value and utility over many years.

Utilities installed a total of 22,470 miles of piping during the year. Of the total, 19,920 miles were plastic. Of the 24,822 miles expected to be installed in 1984, an estimated 19,494 miles will be plastic.

Executives at 350 gas distribution utilities across the U.S. were asked, "Are you using more plastic pipe now? Why? If so, how has it changed your procedures and equipment inventory?" The answers include:

"Conversion of equipment has been a major expense, and we have had major changes in employee training, with retraining on an annual basis. We are using plastic anywhere that conditions permit."

"Management is committed to total plastic distribution system. We have gone almost totally to mechanical fittings."

"We are using 98% plastic pipe now for economic reasons and in an effort to reduce cathodic demands."

"We had to tool up for plastic pipe installation and learn new procedures."

"Steel pipe is now ordered only for specific jobs. Inventories are kept to a minimum."

"Each year we tend to use more plastic pipe than in years past."

"We use plastic pipe for cast iron inserts only."

"Plastic pipe is easier to install and maintain."

Another advantage plastic pipe has over cast iron or steel is the lack of a need for a replacement program. There may be a change in that as the plastic approaches the age of some of the cast iron or steel systems in the U.S., but so far there appears to be no need for a replacement program, according to answers to the question, "Do you have a replacement program for plastic pipe?"

"We have used plastic pipe for 14 years and it is performing satisfactory. We have no evidence to indicate that replacement should be considered."

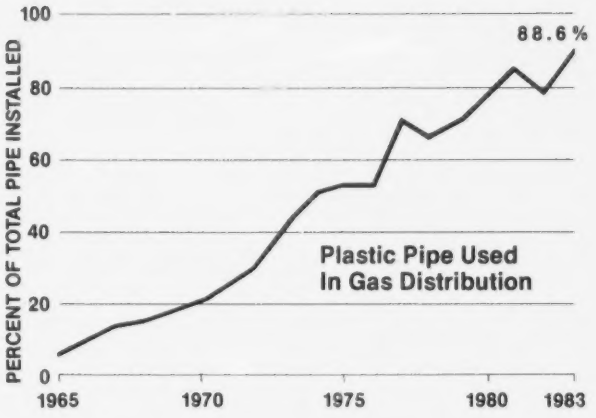
"No, and I hope we never need one."

"The only plastic replacement taking place at this time is that of replacing earlier inferior types of plastic pipe."

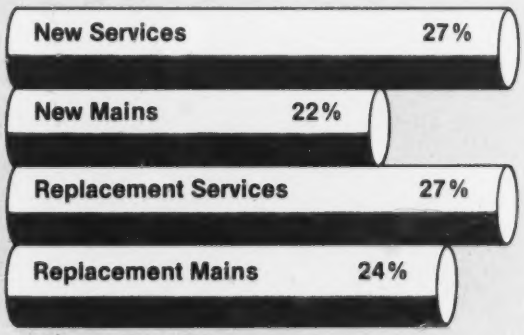
"Yes, replacement of all PE 3306 services on a three-year program."

"We do have a monitoring system. The life of plastic pipe in service still must be determined."

"The older type plastic mains and services are occasionally replaced, but there is no schedule." **P&GJ**




**Where Gas Utilities Use Plastic Pipe**



T-2435-1A

AN HBJ ENERGY PUBLICATION

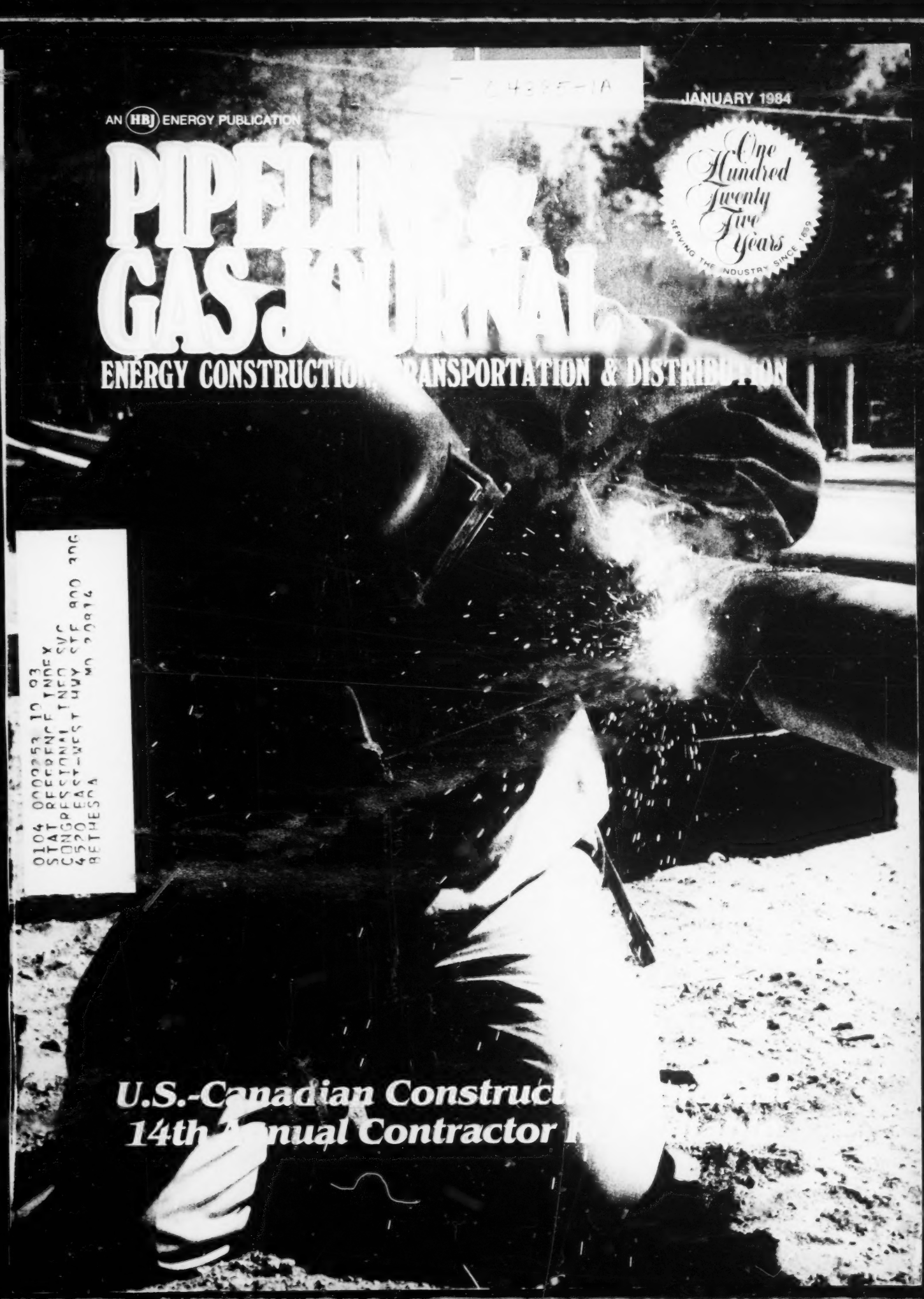
JANUARY 1984

One Hundred Twenty Five Years
SERVING THE INDUSTRY SINCE 1859

# PIPELINE & GAS JOURNAL

## ENERGY CONSTRUCTION, TRANSPORTATION & DISTRIBUTION

0104 000253 10 03
STAT REFERENCE INDEX
CONGRESSIONAL INFO SVC
4520 EAST-WEST HWY STE 800 3DG
BETHESDA MD 20814



## U.S.-Canadian Construc
## 14th Annual Contractor

# PIPELINE & GAS JOURNAL

*International Pipeline & Gas Utility Design, Construction & Operation*

*Published Continuously Since 1859*


## in this issue


Newsreel 2
Highlights of month's news

Government Guidelines 4
State & Federal regulatory memo

Upstream 6
Future events in today's news

Reflections 8
A glimpse of 50 & 100 years ago

MCF 10
Industry news/developments

Projects 12
New systems/expansion/developments

People On The Move 46

Bookshelf 46

Meetings 48

Advertiser's Index EM12

Energy Management Report

Comment EM 1

Energy World Report EM 2

3rd Quarter Report EM 3

Financial Notebook EM 6

New Products EM 7

**COVER**

The ubiquitous weldor typifies the pipeline construction scene — one that, in 1984, will be seen on many smaller but more numerous projects.

*—photo courtesy Wisconsin Gas Co.*


JANAUARY 1984 • VOLUME 211 • NUMBER 1



Adaptable Contractors Will Thrive In Changing Domestic Market .....18

Projects will be smaller, but there will be more of them, requiring more but smaller contractor operations during 1984, say participants in P&GJ's 14th annual Contractors Roundtable; both equipment and contractors will have to be able to do more than one job.

Pipelines' Economic Advantages Will Aid Industry, Contractors Say .....24

Pipelining will be active in widely scattered areas of the world as demand for energy keeps pace with increased level of economic activity projects that make economic sense come to fruition, say participants in P&GJ's International Pipeline Contractor Roundtable.

Modest Construction Year Seen In 1984 For U.S., Canada Pipelines .....28

Pipeline construction activity in 1984 in U.S. will focus on shorter main lines, loop lines, laterals, and continuing expansion of oil and gas gathering systems.

What's New in Construction Equipment ....36

Gas Utility Equipment Ownership, Utilization Changes Notable .....40

Gas distribution utilities are using bigger, more productive equipment and more efficient construction operations to accomplish needed replacement, maintenance, and repair work; utlities own over 202,750 units of construction equipment, major tool items, and units of transportation equipment, according to P&GJ Construction Equipment Census.

Helicopter Pipelift Gets Beluga-Anchorage Line Underway .....44

First step towards construction of new 100-mile 20-in. gas pipeline in Alaska required offloading pipe from barges by helicopter.

# Modest Construction Year Seen For U.S., Canada Pipelines

by **Dean Hale**, *Editor*, and **Jim Watts**, *Assistant Editor*

Pipeline construction activity in 1984 in the U.S. will focus on shorter main lines, loop lines, and laterals, along with continuing expansion of oil and gas gathering systems.

As of Jan. 1, 1984, planned and proposed pipeline projects in the U.S. totalled 30,072 miles. For 1984, an anticipated 8385 miles of new trunk pipelines and gathering lines will be constructed, including 4280 miles of oil and gas gathering lines and 4105 miles of gas transmission, crude oil, products, and $CO_2$ pipelines, according to PIPELINE & GAS JOURNAL's annual survey of U.S. pipeline construction.

Pipeline company executives and planners attribute the lessened activity to a continuing lower demand for hydrocarbon energy and reduced exploration and developmental activity in 1984 and a likelihood of increased energy demand, a need for more pipeline transportation could boost pipeline construction plans beyond current expectations.

Total of all planned and proposed projects in the U.S. and Canada is 41,055 miles. Canadian pipeline construction activity tumbled to slightly less than 1600 miles during 1983 (after a record year in 1982) and the outlook for 1984 is for a total of 1550 miles of all types of pipelines. Most of that work will be relatively short trunk lines, laterals, and oil and gas gathering systems.

The 1984 forecast of 9925 miles of new pipelines to be constructed is predicted on 1983 year-end economic predictions and, with an upsurge in the economy, could improve markedly. Industry executives and analysts note that there is pent-up demand for pipeline transportation facilities. Getting several major projects underway that are now on "hold" would provide a welcome stimulus in the pipeline field.

## Gas Pipelines

Lots of gas pipeline work has been planned for the northeastern U.S., but only one of the three proposals to import additional large volumes of Canadian gas is going to get approval of the Federal Energy Regulatory Commission. The FERC has consolidated hearings on the three–Trans-Niagara, Boundary, and Niagara Interstate Pipeline System–to determine if they are competitive and see if any are ready for hearings. NIPS is expected to have the best chance.

The Niagara Interstate Pipeline System, originating near Buffalo, N.Y. where 0.2 miles of 36-in. dual pipeline would carry gas across the Niagara River, would involve 48.6 miles of 48-in., and 112.7 miles of 42-in. enroute to Transco's Leidy storage field in northwest Pennsylvania. Capacity would be 2.52 Bcf per day; cost would be $417.6 million. Boundary Gas (Tennessee Gas Pipeline) now plans only 104.5 miles of 10 to 30-in. instead of 257 miles of 10 through 42-in.

Texas Eastern plans expansion to accommodate additional imports with three loops on its system in Pennsylvania.

Arkla Gas is planning a 120-mile, 30-in. line from Gurdon, Ark. to Monroe, La. so it can sell additional gas to Southern Natural. Transcontinental Gas Pipe Line Corp. plans to expand its southwestern Louisiana gathering system with 50.6 miles of 42-in.

Mantaray Pipeline Co. (Panhandle Eastern Corp.) has announced plans to build 105 miles of 24 and 36-in. of the south Texas coast, connecting reserves off Matagorda Island to Trunkline Gas in Victoria County.

Natural Gas Pipeline Co. of America plans to replace all of its No. 1 Amarillo line and its existing compression with loops and modern compression. Eventually, 301 miles of new large diameter loop will replace 475 miles of older, smaller line.

Decline of gas transmission lines' activity can be seen in FERC data relating to filings for construction: in first 11 months of 1983, 156 filings for 2252 miles, 162,060-hp, all costing $1.311 billion; in first 11 months of 1982, there were 243 filings for 2135 miles, 241,926-hp, at cost of $2.772 billion; in first 11 months of 1981, there were 263 filings for 3907 miles, 383,905-hp, costing $3.077 billion.

## Crude Oil Pipelines

All-American Pipeline Co., now a unit of Celeron Corp., a subsidiary of Goodyear Tire & Rubber Co., is aggressively pushing its 1200-mile, 30-in. project from Santa Barbara County, California, to near Midland, Texas. Federal and California state officials have "deemed complete" the line's applications for permission to cross federal and state lands. Route of most of the line will follow existing pipeline corridors, making required environmental impact studies easier to prepare.

Status of the Pacific Texas Pipeline Co., a 1026 mile, 42-in. line proposed from Long Beach to Midland, remains unknown. Pacific Texas sponsors have not commented on their project for nearly a year.

Most intense crude oil pipeline activity seems to be occurring at a very unlikely spot—the North Slope of Alaska—where more than 100 miles of crude lines and related flow lines for production and waterflood are being installed. Work at Prudhoe Bay and nearby Kuparuk Field will continue at a high level in 1984.

Big news of 1983 in crude oil lines included completion of the 288-mile, 20-in. Frontier Pipeline in Wyoming and cancella-

## 1984 PIPELINE OUTLOOK

### Miles Planned or Proposed

| Type of Line | U.S. | Canada |
|---|---|---|
| Natural Gas | 9,968 | 8,412 |
| Crude Oil | 3,383 | 908 |
| Products | 3,231 | 813 |
| Slurry | 10,168 | 500 |
| $CO_2$ (Carbon Dioxide) | 3,322 | 350 |
| | 30,072 | 10,983 |

### Projected Completion, Miles

| Type of Line | U.S. | Canada |
|---|---|---|
| Natural Gas | 2,870 | |
| Crude Oil | 630 | 1,550 |
| Products | 405 | |
| Slurry | — | |
| $CO_2$ | 200 | |
| Oil/Gas Gathering | 4,280 | |
| | 8,385 | 1,550 |

tion of the 1491-mile, 40 and 42-in. Northern Tier Pipeline from the Seattle area to Clearbrook, Minn.

Oil from the offshore Santa Barbara fields will likely be transported to Los Angeles area refineries through one of several pipelines now being studied by Standard Oil of California and ARCO; route would range from 135 to 250 miles and pipe diameter will probably be 24-in.

### Products Pipelines

A relative limited amount of products pipeline construction is expected in 1984 as refiners, pipeliners, and marketers continue study and match demand and supply.

Major projects being planned include 130 miles in Texas by Texas Eastman; the Phillips/HTI/Mapco 820 miles of 10-in. from Williston, N.D. to Conway, Kan.; and Transgulf Pipeline's conversion of the 890 miles of 24-in. gas pipeline to products service plus numerous laterals.

### Slurry Pipelines

Rejection of the *eminent domain* bill for coal slurry pipelines in the U.S. House of Representatives hit hard at the U.S. coal slurry pipeline business. The vote against the bill crunched more than eight years of hard work by slurry pipeline planners and their lobbyists in Washington, especially after early readings of congressional opinion indicated a favorable vote was probable. The turnaround came after a strong and determined effort by the railroad lobby, which also appealed strongly to Midwestern and Western congressmen concerned about "water rights."

Energy Transportation System Inc's 1400-plus mile planned line from Wyoming to Arkansas is being restructured after Arkansas Power & Light Co. elected to utilize unit coal trains on the Burlington Northern and Missouri Pacific railroads instead of the coal slurry pipeline. ETSI is now looking at potential power plant users in Oklahoma and Texas.

Sponsors of the Powder River Pipeline slurry project cancelled their plans, and most of the other major projects are on "hold" until further action can be taken on the *eminent domain* question.

Most viable slurry projects currently are two lines that will carry phosphate ores from mine areas to fertilizer plants.

### Carbon Dioxide Pipelines

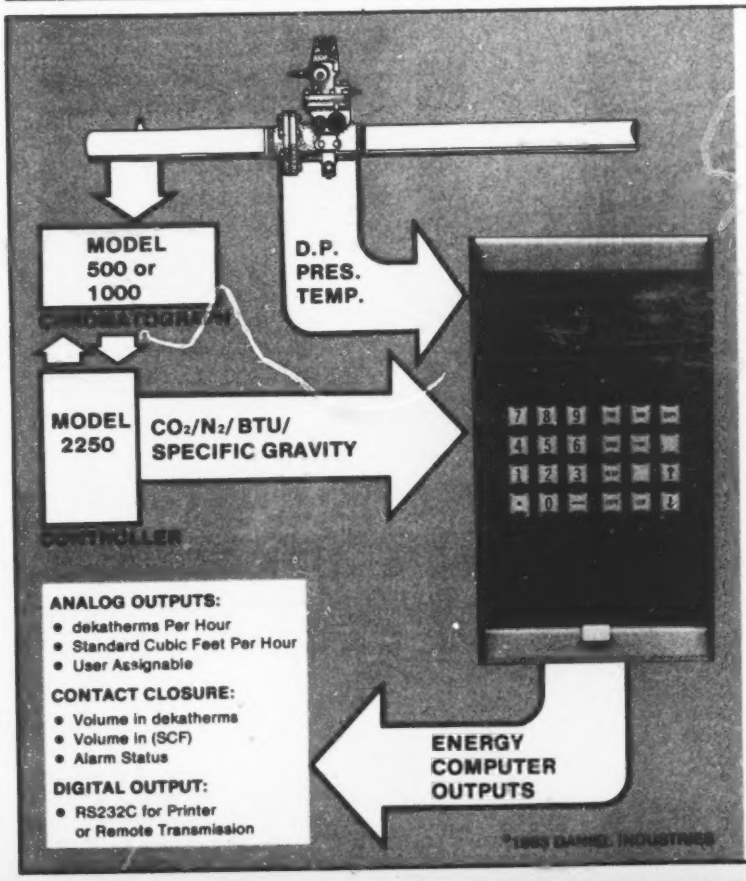
Cortez Pipeline, built by Shell Oil Co., was completed during 1983 and work continued at both ends on gathering and distribution systems. Shell reportedly is studying another major line of about 800 miles of large diameter to transport $CO_2$ from Cortez to northeastern Colorado, Wyoming, and Montana. Shell has other projects in Mississsippi that are temporarily on "hold."

Plans have also been announced for a line to transport $CO_2$ from Wyoming to the West Coast. Other major activity is centered around West Texas and eastern New Mexico. **P&GJ**

## U.S. — Natural Gas Pipelines

| Company | Miles | Size (In.) | From | To | Cost ($Millions) | Status | Contractors/Notes |
|---|---|---|---|---|---|---|---|
| Adobe Gas Co. | 80 | N.A. | Toole, Liberty, and Hill cos., Mont. | | | Planned | |
| Air Products & Chemicals | 30 | 10 & 12 | Plaquemine, La. | Convent, La. | | Planned | Ford Bacon & Davis (E) |
| Algonquin Gas Transmission | 20 | 6 & 30 | Bridgewater, N.J. | Hanover, N.J. | | Planned | Loops |
| ANR Storage Co. | 16 | 36 | Kalkasta County, Mich. | Grand Traverse County, Mich. | 25 | Planned | |
| Arkla | 80 | 30 | Magnolia, Ark. | Monroe, La. | 90 | Planned | Construction begins in spring, completion by winter |
| Celanese Chemical | 21 | 18 | Panhandle, Texas | Pampa, Texas | | Planned | Construction in 1985 |
| Central Illinois Light | 22 | | Henry, Ill. | Princeton, Ill. | | Planned | Construction in late 1984 |
| Colorado Interstate Gas | 36 | 2-20 | Colorado & Kansas | | 5.1 | Planned | Construction in late 1984 |
| | 48 | 2-8 | Texas, Wyoming, Oklahoma, Kansas, Colorado, & Utah | | 5.2 | Planned | Construction in late 1984 |
| Columbia Gas Transmission | 25 | Various | Ohio, Pa., & W. Va. | | | Planned | |
| | 26 | 8 | Clay, Owsley, Lee, & Estill cos., Ky. | | | Planned | |
| | 111 | 16 & 24 | Pennsylvania & Orange cos., N.Y. | | 72 | Planned | |
| | 347 | 2-26 | Ohio, N.Y., Pa., Md., & Ky. | | | Planned | |
| | 21 | 20 | Monroe county, W. Va. | | | Planned | |
| | 22 | 12 | Lawrence County, Pa. | | | Planned | |
| Columbia Gulf Transmission | 4 | 20 | South Pass area, offshore La. | | 4.8 | Planned | Southern Natural, 20% partner |
| | 5 | 12 & 16 | Offshore Louisiana | | 9.9 | Planned | |
| | 10 | 10 | Vermilion area, offshore La. | | | Planned | |
| | 11 | 6 | Eugene Island area, offshore La. | | | Planned | |
| | 13 | 10-16 | Ship Shoal area, offshore La. | | | Planned | |
| | 18 | 20 | Garden Banks area, block 236 | West Cameron area, block B-624 | | Planned | Completion late 1985 |
| | 128 | 10, 12, & 30 | Eugene Island and West Cameron areas, offshore La. | | | Planned | With Natural Gas Pipeline Co. of America |
| Consolidated Gas Supply Corp. | 8 | 20 | High Island area, offshore Texas | | 8.1 | Planned | |
| | 63 | 30 | Canton, Ohio | Ohio River | | Planned | |
| Consolidated Natural Gas | 11 | 30 | Ohio | | 7.8 | Planned | |
| Corpus Christi Oil & Gas Co. | 250 | 24 | North Padre Island | Sabine Pass | | Planned | Tarpon Offshore Pipeline System |
| ENSTAR | 100 | 20 | Beluga River field | Anchorage, Alaska | 70 | U/C | Alaska International Contractors/ Southeast Pipeline Contractors--Completion mid-1984 |
| Equitable Gas Co. | 35 | 16 & 20 | Greene County, Pa. & Monongalia County, W. Va. | | 7.3 | Planned | 1st phase of 3-year program |
| Faustina Pipeline Co. | 00 | 24 & 30 | Erath, La. | Industrial facilities near Baton Rouge, La. | | U/C | Hollico, R.B. Potashnick, WHC |
| Florida Gas Transmission | 19 | 12 | Putnam County, Fla. | | 6.6 | Planned | |
| | 361 | 30 | La., Miss., Fla. | | 192 | Planned | Loops |
| Galaxie Industries | 22 | 10 | Lamar & Fayette cos., Ala. | | | Planned | |
| Great Lakes Gas Transmission Co. | 21 | 36 | Kalkaska & Crawford cos., Mich. | | 18 | Planned | Bids out 3/84, construction 5/84 |
| | 380 | 36 | Minn., Mich., Wisc. | | 425 | Planned | |
| High Island Offshore System | 66 | 36 | High Island area, offshore Texas | | 101 | Planned | |
| Houston Pipe Line Co. | 40 | 12 | Webb County, Texas | | | Planned | |
| | 66 | 36 | South Texas | | 136 | Planned | |
| Lone Star Producing Co. | 28 | 6 & 8 | Offshore Jefferson County, Texas | Offshore Galveston, Texas | | Planned | |
| Louisiana Resources Corp. | 14 | 30 | Vermilion Parish, La. | | | Planned | |
| | 21 | 24 | Cameron Parish, La. | | | Planned | |
| Memphis Gas, Light & Water | 26 | 6-22 | | Memphis, Tenn. | | Planned | From proposed coal gasification facility |
| Michigan Wisconsin Pipe Line | 37 | 20 | Woodstock, Ill. | Jamesville, Wisc. | 22 | Planned | |
| | 68 | 36 & 42 | Iowa | | 53 | Planned | Part of program to replace No. 1 Amarillo pipeline |
| Mountain Fuel Supply | 44 | 20 | Randolph, Utah | Hyrum, Utah | 15 | Planned | |
| Mustang Fuel Corp. | 30 | 12 | Oklahoma | | | Planned | Completion in 1984 |

| Company | Miles | Size (In.) | From | To | Cost ($MM) | Status | Contractors/Notes |
|---|---|---|---|---|---|---|---|
| Natural Gas Pipe Line Co. of America | 120 | 4-10 | Yuma, Sedgewick, & Phillips cos., Colo. | | | Planned | Gathering lines |
| | 23 | 6, 10 & 14 | West Louisiana & East Texas | | 13.6 | Planned | |
| | 38 | 26 & 30 | Hutchinson & Gray counties, Texas & Beckham County, Okla. | | | Planned | |
| | 92 | 4, 5, 10, & 12 | Garden, Deuel, Cheyenne, & Morrill cos., Neb. | | | Planned | |
| Niagara Interstate Pipeline System | 162 | 36, 42, & 48 | Niagara Falls, N.Y. | Leidy storage area, Pa. | 417.6 | Planned | |
| Northeastern Arkansas Transmission | 24 | 16 | Halls, Tenn. | Barfield, Ark. | 8.7 | Planned | |
| Northern Indiana Public Service | 11 | 8 & 12 | Indiana | | 3.6 | Planned | Company crews–completion 1984 |
| | 25 | 8, 16, & 30 | Indiana | | 7.6 | Planned | Company crews–completion 1985 |
| Northern Natural Gas Co. | 120 | 4-12 | Iowa, Neb., & Minn. | | | Planned | |
| | 69 | 4 & 8 | Minn. & Neb. | | | Planned | |
| | 39 | 26 | Iowa & Ill. | | 68.3 | Planned | |
| | 27 | 12 | Sprayberry field, Texas | | 4.5 | Planned | Completion in 1984 |
| | 13 | 20 | Onshore Texas | | 7.4 | Planned | Completion in 1984 |
| | 10 | 10 | High Island area, offshore Texas | | 5.3 | Planned | Completion in 1984 |
| | 9 | 20 | Matagorda Island, Texas | | 11.9 | Planned | Completion in 1984 |
| Northwest Alaska Pipeline Co. | 745 | 48 | Prudhoe Bay, Alaska | Alaska-Yukon border | 10,600 | Planned | Deferred until 1989 |
| Northwest Pipeline Corp. | 185 | 30 & 36 | Colo., Utah, & Wash. | | | Planned | Completion in 1984 |
| | 175 | 4-12 | Moxa Arch area, Wyo. | | | Pla[illegible] | Gathering Lines |
| | 80 | 6 & 12 | Lincoln, Uinta, & Sweetwater cos., Colo. | | | Planned | |
| | 43 | 22 | Ore. & Idaho | | | Planned | Loops |
| Northwest Central Pipe Line | 31 | 6 & 10 | Kay County, Okla, Sumner & Crowley cos., Kan. | | 2.9 | Planned | 2-year program |
| Nueces Co. | 24 | 4 & 6 | Colorado | | | Planned | |
| Pacific Gas & Electric | 290 | 42 | California | | 236 | Planned | |
| | 112 | 34 | Little Cojo Bay, Calif. | Gosford, Calif. | | Planned | |
| Palo Duro Pipeline Co. | 240 | 24 | Texas Panhandle | Sweetwater, Texas | 96 | Planned | |
| Panhandle Eastern Pipeline Co. | 92 | 4-16 | Weld & Adams cos., Colo. | | 10 | Planned | |
| | 60 | 4-6 | Wattenberg field, Colo. | | 6.9 | Planned | |
| | 37 | 4-10 | Woods & Woodward counties, Okla. | | 6.1 | Planned | |
| | 32 | 8 & 10 | Major County, Okla. | | 4.9 | Planned | |
| | 26 | 6 & 10 | Sweetwater County, Wyo. | | 3.9 | Planned | |
| Quivira Gas Co. | 25 | 18 | Eugene Island area, offshore La. | St. Mary's Parish, La. | | Planned | |
| | 24 | 12 | Eugene Island area, offshore La. | | | Planned | |
| Sabine Pipeline Co. | 5 | 12 | West Cameron area, offshore La. | | 4.7 | Planned | Completion by spring 1984 |
| Seagull Energy Co. | 163 | 12 & 24 | Brownsville, Texas | Galveston County, Texas | | Planned | Seagull Shoreline System–first phase, 55 miles of 24-in., completed 11/83 by Brown & Root |
| Sohio Chemical Co. | 45 | 16 | Paulding, Putnam, Allen, & Van Wert cos., Ohio | | 16.42 | U/C | Welded Construction (C) |
| South Jersey Gas Co. | 15 | 20 | Cumberland & Atlantic cos., N.J. | | | Planned | Completion in 1984 |
| Southern California LNG Terminal | 63 | 32 | Ventura County, Calif. | | | Planned | |
| Southern Natural Gas | 40 | 18 | Offshore La. | | 9.6 | Planned | |
| | 34 | 10 | Carthage field, Texas | | 10.6 | Planned | |
| Southern States Pipeline Co. | 32 | 12 | Norco, La. | Sorrento, La. | | Planned | |
| Southwest Gas Co. | 20 | 16 | Mohave County, Nev. | Arizona | | Planned | |
| Tennessee Gas Pipeline | 105 | 10-30 | Conn., Mass., N.H., N.J., N.Y., Pa., & Va. | | 41 | Planned | Boundary Gas Project, prebuild phase |
| | 32 | 36 | North & west sides of Houston | | 29.4 | Planned | |
| Tejas Gas Co. | 22 | 8 | Zapata County, Texas | | | Planned | With Coronado Transmission |


# THE TOTAL ENERGY COMPUTER

The Model 2231E is a total energy computer for orifice measurement. Inputs to the orifice flow equation for $N_2$, $CO_2$, and specific gravity (that normally would be fixed) are available as outputs from the companion Model 2250 Chromatograph Controller. These values, in addition to ΔP, static pressure and temperature, serve as live inputs to the algorithm to solve the AGA-3 orifice equation in the Model 2231E. The BTU value from the Model 2250 is also integrated in the Model 2231E with the orifice flow rate to derive total energy throughput for the system. The Model 2231E is by far the most cost-effective way to solve your total energy measurement problem.

Call your Daniel representative for more information. Or contact the Measurement Experts, Daniel Electronics Division.

P.O. Box 55435, Houston, Texas 77255.
Phone: 713-467-5656.

DANIEL INDUSTRIES, INC. Electronics Division 133R

Circle 120 on Reader Service Card

| Company | Miles | Size (In.) | From | To | Cost ($MM) | Status | Contractors/Notes |
|---|---|---|---|---|---|---|---|
| Texas Eastern Corp. | 8 | 30 | Perulak, Pa. | Bechtelville, Pa. | | Planned | Completion in 1984–Phase one of project to increase volume of gas from Canada |
| | 81 | 25 | Tamarack, Pa. | Perulack, Pa. | | Planned | Phase 2–from termination of NiPS |
| | 13 | 30 | Perulack, Pa. | Bechtelville, Pa. | | Planned | Phase 3–extension of phase 1 loops |
| | 185 | 30 & 36 | High Island area, offshore Texas | East Cameron area, offshore La. | 240 | Deferred | With Tennessee Gas Pipe Line |
| | 13 | 8 & 12 | Chandelur area, offshore La. | | 14.6 | Planned | |
| Texas Gas Transmisison | 13 | 20 | Eunice compressor station, La. | | 12.7 | Planned | |
| | 10 | 10 | Vermilion Parish, La. | Lakeside Mallard Bay, La. | | Planned | |
| | 5 | 12 | Roanoke system | Lakeside Mallard Bay, La. | | Planned | |
| Texas International Petroleum Corp. | 25 | 24 | Offshore St. Bernard Parish, La. | | 25 | Planned | With Southeast Louisiana Pipeline Corp. |
| Trans-Anadarko Pipeline System | 468 | 36 | Custer County, Okla. | Monroe, La. | 487.5 | Planned | Phase 1–approved by FERC 11/82 |
| | 167 | 36 | Moore County, Texas | Custer County, Okla. | 212.5 | Planned | Phase 2–deferred |
| Transcontinental Gas Pipe Line Corp. | 230 | 10-42 | Pa. & N.J. | | | Planned | Loops on Leidy system |
| | 51 | 42 | Allen & Pt. Coupee parishes, La. | | 48.8 | Planned | |
| | 29 | 12, 16, & 20 | Brazos and Galveston areas, offshore Texas | | 29.5 | Planned | With Tennessee Gas Pipeline |
| | 33 | 20 | Matagorda Island area, offshore Texas | | 27.5 | Planned | |
| | 14 | 10, 12, & 20 | High Island area, offshore Texas | | 23.1 | Planned | |
| Transwestern Pipeline Co. | 80 | 12 & 20 | Hemphill County, Texas | Roger Mills County, Okla. | 38.1 | Planned | |
| | 59 | 20 | Oklahoma | | | Planned | |
| | 58 | 8, 10, & 12 | New Mexico | | 10 | Planned | |
| | 36 | 20 | Chaves County, N.M. | DeBaca County, N.M. | 23.6 | Planned | |
| United States Natural Gas Corp. | 53 | 6, 12, & 16 | West Cameron Area, offshore La. | Cameron Parish, La. | 7 | Planned | |
| Valero Energy Corp. | 43 | 20 | Karnes & DeWitt cos., Texas | | 25.4 | Planned | Phase 1 of a 2-year program |
| Yukon Pacific Corp. | 820 | | Prudhoe Bay | Kenai Peninsula | 2600 | Planned | Part of proposal to ship LNG to Japan and the U.S. |

## U.S. — Crude Oil Pipelines

| Company | Miles | Size (In.) | From | To | Cost ($MM) | Status | Contractors/Notes |
|---|---|---|---|---|---|---|---|
| All American Pipe Line Co. | 1100 | 30 | Bakersfield, Calif. | Midland, Texas | | Planned | |
| Continental Pipeline | 12 | 18 | Milne Point, Alaska | Kuparuk Pipeline | | Planned | Completion in 1984 |
| DOE | 26 | 36 | Nederland, Texas | Big Hill, Texas | | Planned | Part of SPR program |
| Four Corners Pipeline | 180 | 24 | California | | 200 | Planned | Bechtel Petroleum (E) |
| Grand Valley Pipeline Co. | 166 | 16 | Southeast Utah | Rangley, Colo. | | Planned | |
| Getty Oil Co. | 90 | N.A. | Gaviota, Calif. | Bakersfield, Calif. | | Planned | |
| Kuparuk Pipeline Co. | 36 | 12, 18, & 24 | Prudhoe Bay | TAPS No. 1 Station | 90 | Planned | Completion in 1985 |
| Mobil Oil Exploration & Production Southeast | 20 | 4-20 | Lower Mobile Bay, Ala. | South Mobile County, Ala. | | Planned | 5 lines in single ditch |
| Northville Industries | 211 | 30 & 36 | Texas City, Texas | Houston, Nederland, and Freeport, Texas | | Planned | Brown & Root (E) |
| Occidental Petroleum Co. | 150 | 24 | Colorado | Wyoming | | Planned | Completion in 1985. Will carry shale oil. |
| Standard Oil of California/ARCO | 130-250 | N.A. | Offshore Santa Barbara, Calif. | Refineries near Los Angeles | 200-300 | Planned | Completion in late 1986 or early 1987 |
| Union Oil of California | 18 | 10 | East Breaks area, offshore Texas | High Island area, offshore Texas | | Planned | Completion in mid-1984 |

# Housing Engineered For Performance

Depend-A-Check®

Hoerbiger Depend-A-Check valves are custom-designed all the way—from size of valve to type of housing—to give you the *right valve for the job*. We study your operating pressures, flow conditions, etc.—only then recommend the bell or wafer housing best for your application. Contact us for data.

HOERBIGER® CORPORATION OF AMERICA, INC.

P.O. Box 8886, 7201 N.W. 15th Ave., Ft. Lauderdale, FL 33310. Phone 305-974-5700

Circle 123 on Reader Service Card

# Put us in your pipeline plans.

TULSA-HOUSTON operates four mainline pipeline spreads in the U.S. And within the last three years, we've constructed over 2,000 miles of pipeline and double-jointed over 500 miles of pipe. From 4 inch to 40 inch. For mainline, gathering, river crossings, double jointing, rehab and hydrostatic testing.

If you have pipeline plans, go with the pro in pipeline construction. Go with TULSA-HOUSTON.

**TULSA-HOUSTON, INC.**
**Pipeline Contractors**

P.O. Drawer V
Tulsa, Oklahoma 74112
(918) 272-9591
Telex 79-6421

Circle 122 on Reader Service Card

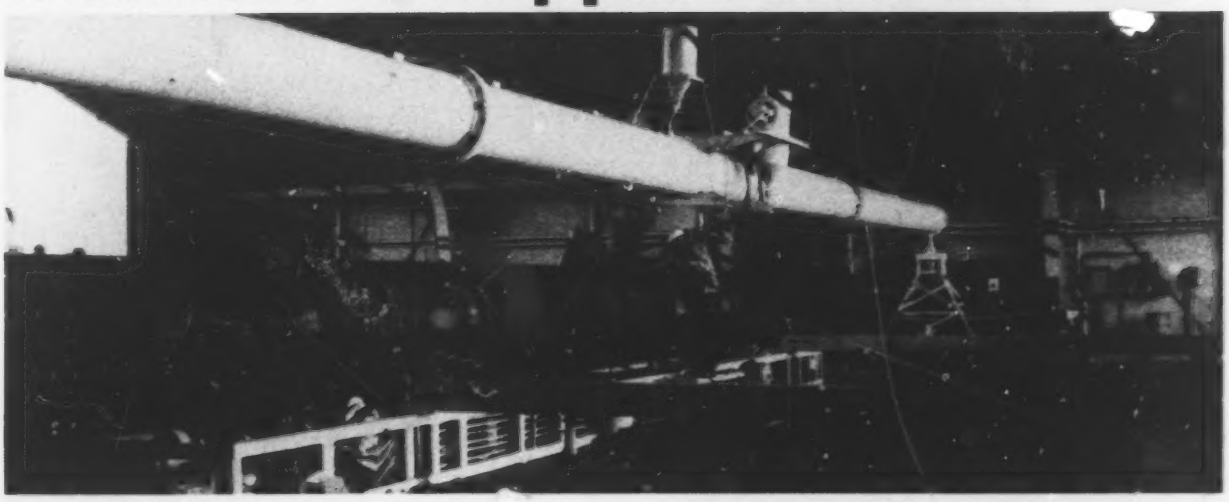
## U.S. — Product Pipelines

| Company | Miles | Size (In.) | From | To | Cost ($MM) | Status | Contractors/Notes |
|---|---|---|---|---|---|---|---|
| ARCO Oil & Gas | 31 | 6 | Offshore Louisiana | Onshore Louisiana | | Planned | Ford Bacon & Davis (E) |
| Celanese Chemical Co. | 21 | 18 | Texas | | | Planned | Completion in 1985 |
| Continental Pipeline | 88 | 6 | Sheridan, Wyo. | Gillette, Wyo. | | Planned | |
| ENSTAR, Dow Chemical, Shell Chemical | 800 | 16 & 20 | Prudhoe Bay | Valdez or Anchorage, Alaska | 1200 | Planned | |
| Enterprise Pipeline | 23 | 8 | Napoleonville, La. | Geismer, La. | | Planned | Dual lines |
| Exxon Pipeline Co. | 18 | 8 | South Louisiana | | | Planned | |
| Koch Oil Co. | 30 | 6 | Kingfisher, Okla. | El Reno, Okla. | | Planned | LPG |
| MAPCO | 41 | 3 | Texas | | | Planned | LPG |
| Phillips Petroleum Co. | 820 | 10 | Williston, N.D. | Conway, Kan. | | Planned | |
| Quivira Gas Co. | 25 | 6 | Eugene Island area, offshore La. | St. Mary's Parish, La. | | Planned | |
| Seagull Products Co. | 169 | 6 & 8 | Upper Texas Gulf Coast | Mt. Belvieu & Baytown, Texas | 70 | Planned | Phase 1, 121 miles, built in 1983 |
| Texas Eastern Co. | 130 | 6 & 8 | Longview, Texas | Shreveport, La. | | Planned | Ford Bacon & Davis (E&C) |
| Transgulf Pipeline Co. | 890 | 14, 18, & 24 | Baton Rouge, La. | Ft. Lauderdale, Fla. | 140 | Planned | Conversion from gas service |
| | 80 | 12-18 | Louisiana & Florida | | | Planned | Laterals to terminals |
| | 12 | 4 & 26 | Florida | | | Planned | Loops |

## Canada — Natural Gas Pipelines

| Company | Miles | Size (In.) | From | To | Cost ($MM) | Status | Contractors/Notes |
|---|---|---|---|---|---|---|---|
| Amerada Minerals Corp. | 105 | 4 & 6 | Carstairs | Didsbury-Olds area | | Planned | |
| B.C. Hydro | 46 | 24 | Mainland | Vancouver Island | 457 | Planned | |
| | 170 | 8-20 | Vancouver Island | | | Planned | Distribution |
| Bow River Gas Pipelines | 20 | 4 & 6 | Southeast Alta., various fields | | | Planned | |
| Canadian Superior Oil Co. | 25 | 6-12 | Liege field, Alta. | | | Planned | |
| Canadian Western Natural Gas | 28 | 24 | Beiseker | East Calgary | | Planned | |
| | 44 | 12 | Cayley | Fort McLeod | | Planned | |
| | 30 | 12 | Lethbridge | Taber | | Planned | |
| | 30 | 12 | Taber | Bow Island | | Planned | |
| Canterra Energy Co. | 42 | 8 & 18 | South Hanlan field | Blackstone, Alta. | | Planned | |
| | 15 | 10-30 | Jarvie storage field, Alta. | | | Planned | |
| Centennial Natural Gas Pipeline Ltd. | | | Mainland | Vancouver Island | 577 | Planned | Planned |
| Dome Petroleum Ltd. | 545 | 26 | Windsor Creek | Grassy Point, B.C. | | Planned | Western LNG project |
| | 85 | 3-10 | West Pembina field | | | Planned | |
| | 67 | 3-10 | Primrose-Kirby area | | | Planned | |
| East Coast Pipe Line Ltd. | 1000 | 36 | Sable Island fields, Offshore N.S. | Montreal | | Planned | |
| Foothills Pipe Lines (South Yukon) Ltd. | 276 | 56 | Southern Yukon | | | Planned | |
| | 232 | 48 | Southern Yukon | | | | |
| Foothills Pipe Lines (North BC) Ltd. | 444 | 56 | Northern B.C. | | | Planned | |
| Foothills Pipe Lines (Alberta) Ltd. | 394 | 56 | Alberta | | | | |
| Foothills Pipe Lines Ltd. | 740 | 34 | Whitehorse | Mackenzie Delta | 2500 | Planned | |
| | 105 | 36 | Southeastern B.C. | | | Planned | |
| Gaz Inter-Cite Quebec | 249 | N.A. | Trois Rivieres | Chicoutimi, Que. | | Planned | |
| | 87 | N.A. | Sabrevois | Sherbrooke, Que. | | Planned | |
| Gaz Metropolitain | 379 | 1-20 | Montreal area | | | Planned | |


# The new kid on the block in double jointing pipe is the nation's oldest pipeline contractor.



In just 3 short years we have already made a name for ourselves as double jointing specialists on jobs like the Northern Border and Trailblazer. Our Double Jointing rack travels throughout America wherever it is needed. Call us for your next double-jointing venture.

**America's Pioneer Pipeline Construction Company**

SHEEHAN
Pipe Line Construction Company
1924 S. Utica • Tulsa, Oklahoma 74104 • (918) 747-3471

**Circle 124 on Reader Service Card**